## XX.—*On the Animals of* Cæcum trachea *and* C. glabrum.
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*To the Editors of the Annals of Natural History.*

GENTLEMEN, Norfolk Crescent, Bath, June 28th, 1849.

IN the year 1834 I discovered the animal of *Cæcum trachea,* in the coralline zones off Exmouth; notes were then made on it, but only communicated to a few friends, and I am not aware that any author has mentioned the animal since that time, except in doubt, as to its character and position. Having within the last week, at the same place, examined many of this curious and minute species, I am enabled to give a particular description thereof, as well as some account of the still more minute congeneric species, *Cæcum glabrum,* now seen for the first time.

The shells of these animals have, from their forms, long been located with the *Dentalia,* but it will appear that in respect of the animal they have little connection with them; they have also had other places assigned to them, and malacologists are still in doubt with regard to their natural position. I therefore think this account may interest some of your readers, and assist to determine the proper "locus standi" of these mollusca.

### CÆCUM, *Fleming.*

### *Cæcum trachea et imperforatum,* Montagu.

Animal cylindrical, arcuated, externally pure white; the mantle is very thick and fleshy, fitting the shell closely, and not extending beyond its anterior margin; the body is elongated and slender, with a long flat head, which on all occasions is in advance of the foot, and appears to assist in locomotion; the fissure of the mouth is vertical, and from the tenuity of the skin the pale red buccal mass is distinctly visible, the corneous plates of which are of light yellow and subelliptical form; the tongue was not detected, though, without doubt, one of the invariable spiny character exists.

The tentacula are short, rather thick, subcylindrical, setose, and slightly clavate at the extremities; the eyes are very minute, black, not raised on any kind of pedicle or eminence, and placed nearly in a line with the tentacula at a short distance from their bases, and if there is a divergence therefrom the tendency is external.

The slender neck, as in most of the other Gasteropoda, is furnished with longitudinal ridges, and in this species on each side of its centre, there are two frosted, pale yellowish white, contiguous raised lines forming a very decided canal or groove, the points of which terminate anteriorly at the immediate base of the eyes, and posteriorly at the furthest end of the neck, on the left side of which, at the usual point, may be seen a minute pale red branchial leaflet which puts on the appearance of there being two, a large and a smaller one, as in the canaliferous Gasteropoda; but here, though we cannot vouch that there are not two, we are inclined to think there is only one, with a divergence from its base of a part of its surface; the very marked canal seems necessary for the entrance of the branchial water, in consequence of the neck of the animal, when at rest, being so closely embraced by the fleshy muscular circular mantle, but in marching order it is protruded to an extraordinary extent.

The stomach was distinctly observed, and is an oblong bursiform organ, yellowish white and granular without, but on being opened presents a dark lead-coloured cavity, fortified by strong transverse muscular bands or fillets. From it arises a very long convoluted intestine, and when extracted exhibited the usual fæcal matters; it appeared to coast the liver and ovarium, amongst the folds of which it makes a double, as is usual with the regular Gasteropods, then progresses to the right side, where the minute, elongated, oval, conically pointed pellets were observed to be ejected.

The ovarium is dark red-brown, aspersed with the most minute darker points, like the finest sand, with its posterior extremity fixed in the hollowed-out chamber of the terminal process of the shell; it then extends to the stomach accompanied by the liver in alternate transverse portions; this organ is a light greenish mass formed of larger granules than the ovarium, and the contrast in colour of the two substances caused them to be observed without difficulty.

The neck admitted of a close examination, and did not exhibit the slightest traces of external reproductive organs; it would then appear that the animal must depend on its own influences, but there are doubts; and from the concordance of all its organs with a large class of the Pectinibranchous Gasteropods, it may, like them, be unisexual, though the organs have escaped detection; but in all the specimens examined the ovarium was present in the usual place, and in no instance appeared to be replaced by the testicle, but the discriminations of such minute organs cannot be depended on.

The foot is short, narrow, and truncate anteriorly when in action, sloping posteally to an obtusely pointed or rather rounded termination, on the upper part of which end is fixed the strong, circular, corneous, black-brown operculum, smooth and conical on the surface attached to the foot, concave without, and from its centre seven or eight fine close-set *spiral* lines, not concentrical, fill up the area.

The animal is not at all shy; it shows itself in all directions, marches with great vivacity, carrying its shell sometimes with the convexity upwards, resting on the posterior point, or on one of the sides, frequently changing one for the other, by suddenly withdrawing the head and body, by which action it is thrown on the operculum at an elevation of 50° or 60°; it then turns on the side it wishes.

It thus appears that this minute creature has all the organs of the Gasteropoda with entire apertures; there are some modifications of them, and the animal is not spiral; still in number, quality and purpose they are essentially the same as those of this large class, and I think it is clear that the genus *Cæcum* must be placed with them, in the immediate vicinity of the *Rissoæ*.

It is necessary to mention that the *Dentalium imperforatum* and *D. trachea,* the types of the genus *Cæcum,* are identical; this fact is I believe generally admitted; I will however in corroboration thereof observe, that in the same watch-glass of sea-water I carefully examined each of the two forms of this species, and their respective organs differed in no respect, except that the colour of the buccal mass in *C. trachea* (Mont.) was somewhat paler than that of *C. imperforatum,* in consequence of its adolescence. I have made a second examination of the animals of both forms with the same result.

The shell of *Cæcum imperforatum* (Mont.) is *never* found *otherwise* than *adult*; this fact proves that *C. trachea* is the young shell, of which I have seen hundreds of all sizes and gradations of arcuation and tapering of the posterior extremities: these shells, like some others of the Gasteropoda, particularly those of the genera *Aporrhais* and *Turritella,* have as a provision of nature the power to protect their delicate extremities by withdrawing them from the posterior pointed ends of the shells, some chambers of which they plug up; these being deprived of the animal, fall off and decay, and it remains uninjured. This is the case with *Cæcum trachea,* which probably performs this manœuvre more than once, until it arrives at the form *C. imperforatum,* with its adult constricted orifice, which it never has in a young state; and even when the anterior part of the shell is broken, the animal always repairs it with a somewhat fuller cylinder; but the new orifice will not be constricted until the mutilated shell has arrived at the complete adult state, and it is rarely seen in this condition. What is called the posterior process of the shell is only one of the testaceous plugs with which the animal from time to time closes the posterior extremity.

As to the specific appellations of *trachea* and *imperforatum,* though not quite contemporaneous, the more significant one of *trachea* ought, I think, to be adopted, as that of *imperforatum* is obviously improper.

The generic term *Cæcum* appears to be somewhat objectionable in point of significancy. On the discovery of the animal I proposed to my friend Dr. Goodall, the late Provost of Eton, the generic appellation of *Dentaliopsis,* which I think I also mentioned to Mr. Jeffreys of Swansea; but Dr. Fleming is in possession of the field, and has the undoubted priority, and I may say, owing to *my own neglect,* in not launching the genus:

> "Hos ego . . . . . feci, tulit alter honores."

### *Cæcum glabrum,* Montagu.

After a research, in which I almost despaired of success, I have had the good fortune to meet with two living vivacious specimens of this species in the coralline zones of the Devonshire coast, off Budleigh Salterton, six miles from the shore, in ten fathoms water.

To describe the organs of this animal would only be a repetition of what has been said on *Cæcum trachea*; I will only recapitulate them and notice the modifications thereof.

The brown ovarium, light green liver, and the rectum with its contents of formed pale-brown pellets extending from the pylorus to the doubling amongst the folds of the liver, were distinctly visible through the transparency of the shell. The stomach, body and neck were of the purest white; the lines forming the canal or groove in the neck are less developed than in the former species; the buccal mass is of the palest blush colour, and the corneous plates of the most delicate and lightest green; the spiny tongue was not seen; the same default occurred in *Cæcum trachea,* probably from its white colour and extreme slenderness; it doubtless exists; the mantle is thick, circular and muscular, closely fitting the shell; the eyes are precisely fixed as in *C. trachea*; the very minute branchial leaflet is of the palest rose-colour, but the mantle must be removed to see it, owing to its extreme tenuity.

I now come to those organs in which there are some variations: the tentacula, as in its congener, are frosted white and setose, but they appear to be proportionably longer, slenderer and more clavate at the tips; these variations however are scarcely appreciable. The foot is very short, truncate in front, rounded behind, and carried much more laterally in this species than in *C. trachea*; and on its posterior upper part is the most differential point in the animals, the curious operculum, which is circular, and has six or seven spiral gyrations of a pale yellow, but instead of being concave or flat without and conical within, as in *C. trachea,* it is in both respects the reverse. Represent to yourself the flat spiral circular operculum of the last species, pushed out from its inner surface, or inverted, and thus forming a cone of six or seven minute narrow terraces, one above the other,—you may then figure to yourself the form of that in *Cæcum glabrum*.

This creature marches, and in its course performs exactly the same manœuvres as the larger species. I thought the *Cæcum trachea* very active, but it is far surpassed by this animal; I put one of each in a watch-glass of sea-water, and with a camel's-hair brush gave them a fair start, but the little one beat its competitor hollow, and accomplished a space of 2 inches in 55 seconds; thus affording a proof, even in the Mollusca, that nature compensates for the small volume of the minute beings in giving them greater energy, vivacity and quickness. This creature I found by admeasurement to be $\frac{1}{20}$th of an inch long, and $\frac{1}{100}$th of an inch in diameter.

I have been thus particular, as it will fall to the lot of very few malacologists to see this curious species alive.

I beg to mention that last week, in the offing at Exmouth, six miles from the shore, I dredged in the coralline zone a very small specimen of that rare species the *Lucina orbicularis* of the British Mollusca, and *Venus orbiculata* of Montagu, *testante Laskeyo,* whose figure is an exceeding faithful representation of its shape. This species has been considered of very doubtful British origin, and we feel pleasure in adding it to our Indigena.

The general aspect of the shell is of the palest bluish white on the outside and the same within, with a tinge of yellow at the posterior extremity on both sides.

The longitudinal striæ radiate from the very acute beaks to the ventral margin, and are most evident at the sides of the shell; these are crossed by the striæ of growth, giving it an irregular cancellated appearance; the margin is quite plain and acute.

There are in the left valve three primary teeth, and a contiguous anterior lateral one, and in the right valve, three primary teeth with a receptacle for the lateral tooth of the left, and in each valve there are faint traces of posterior laminæ; this is the hinge of the genus *Circe* of the 'British Mollusca,' but the twenty-four radiating longitudinal flattish costellæ eminently distinguish this species from *Circe minima*: I am inclined to think Montagu's shell should be styled *Circe* instead of *Lucina orbiculata*; that excellent conchologist mentions only two primary teeth in each valve, but the third might easily escape detection, as when he wrote imperfect instruments were in use, and perhaps there was a less critical examination of objects than in the present day. If this shell is not the *Venus orbiculata* of Montagu, as we confidently think, it must be considered a new species of *Circe*. The minute specimen is brilliantly fresh.

I am, Gentlemen, your most obedient servant,

William Clark.